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Meta-analysis of Studies on Educational Technology in Iran

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Abstract

The present study aims to Meta-analyze the previous researches on the effect of ICT on student's educational improvements to show the real value of ICT. The research sample consists of all previous researches done on the effect of ICT till 2010 in Iran. The purposeful sampling was done for selection of 12 appropriate researches to enter the meta-analysis. The tools of data gathering includes check list of choosing researches technically and methodologically. The meta-analysis method consists of the mixed approach of Hunter and Smith and Cohen for interpretation of results. Findings confirmed that ICT has a significant effect on educational improvement. The effect size was 0.353

Keywords: Meta-analyze, ICT, Students Educational Improvements

1.Introduction

It has been a long time that digital waves passed from all the life stages and transfer whatever it touches. Today, in most developed countries, investing on ICT was mostly on education, mixing ICT and education can be seen in areas like teaching and learning, professional development, teaching citizenship services, management and infrastructures of production planning and educational services.

Nichols (2008) believed that integrating new technologies with teaching and learning is basically part of knowledge based educational sciences. Lienonen hypothesized the paradigm shifts in relation between ICT and education in five historical phases.

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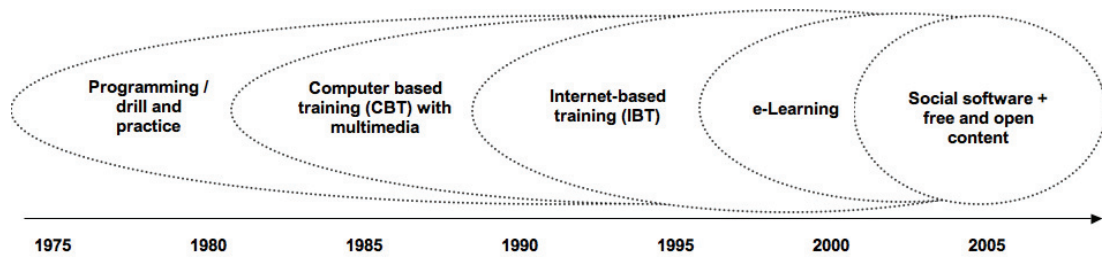


Figure 1. the conceptual map of Lienonen.

According to this model, from the last decade of 1970 till first of 80, programming was drill and practice. From the last decade of 1980, education was computer based training (CBT) with multimedia, last decade of 90 internet-based, first of 2000 e-learning and early of The third millennium social software with free and open content (Lienonen, 2010). Application and teaching technological tools in schools continues and the purpose is utilizing their capacities and familiarizing students with IT and ICT characteristics and capabilities and encouraging students to think (Crumpacker, 2003). If learning environment programmers prepare the educational elements through considering ICT characteristics and capabilities, can improve the content learning and some basic skills like problem solving, creativity, planning, managing and human and social relation in learners (Velar, 2005). Meta-analysis is the most reliable statistical method for mixing the result of a collection of independent researches (Johnson, 2000). Therefore, a meta-analysis can draw an effective view on the effect of ICT on educational development. The present study tries to answer this question that if applying ICT can affect the student educational improvement? And how is the effect size of it?

2. Research Methodology

The study is a kind of qualitative and documental research. The research sample consists of all the researches done on ICT till 2010. For an improbable purposeful sampling, 12 research documents with ICT as an independent variable. It has been proved that all of them had a control group or comparing the results of pre-test and post-test, enough information for qualitative integration of results and getting the same results. The data gathering tools was codified form to evaluate the research variables and characteristics. The data analysis method was based on integration of results. For data analysis central tendency indexes, for data analysis homogeneity test, fixed and random effects meta-analysis models for data analysis (1988), Cohen's interpretive system (1988) and funnel plot figures were used. All of them were done by Comprehensive meta-analysis-v2 and in size effect integration method.

3. Research Findings

Findings of the first question: Can we decide on the effect of ICT on educational improvement according to meta-analysis of the reported researches?

For the statistical analysis of this question, the effect size integrating method was used. For doing it, the single effect size of all selected researches figured out on the basis one scale, the fixed and casual integrating effect of all were identified. All of them were done by Comprehensive Meta analysis v2. Figure 2 is on the basis of confidence interval single size effect of sample researches.

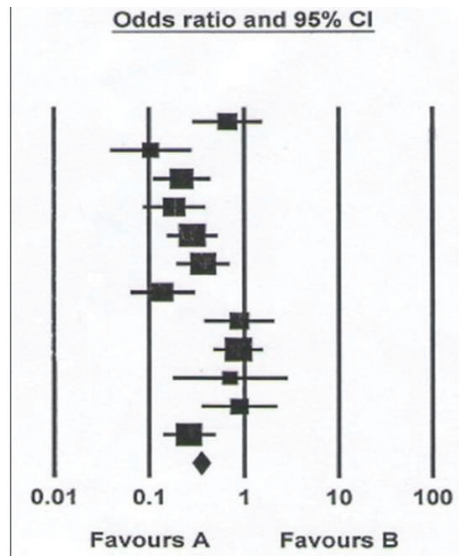


Figure 2. Forest plot of sample researches

A part of every meta-analysis is publication bias by published researches and unpublished researches and different errors. Funnel plot is drawn for the study of publication bias. It shows that researches have publication bias at the average.

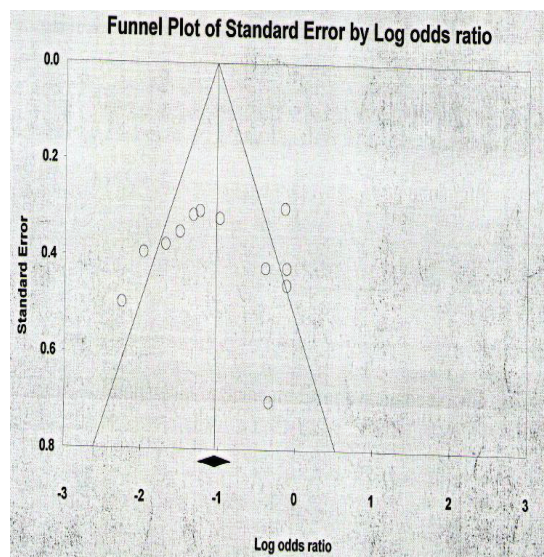


Figure 3. funnel plot of sample researches

According to the funnel plot, the researches have a relative publication bias.

Findings of the second question

What is the amount of size effect on student's educational improvement? ICT application explains student's educational performance? How

Table 1. Cohen, model, size effect interpretive system of metaanalysis

d	r	Size effect
0.2	0.1	low
0.5	0.3	average
0.8	0.5	high

Interpretation of size effect in this study according to Cohen's table, is nearly average. So, ICT is effective on students educational improvement at the average.

3. Discussion

Research studies confirm that ICT can be helpful in every field. So, instead of repeating such a research, through integrating the results of ICT variable effects, the effect of ICT can be clarified and the effect size can be clearer. For example, the meta-analysis of Ryan (1991) studied 40 researches on the effect of ICT on processes and results of education particularly educational improvement and the effect size was 31. Kulik & Kulik (1991) studied 199 researches and the effect size was 30. Khaili & Shashaani (1994) studied 36 researches and the size effect was 38. Liao (1998) studied 35 researches and the size effect was 48. The present study showed that whatever the ICT application for teaching concepts to students be more, the educational performance is higher.

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